

USSN: 10/720,617
Atty. Docket No.: 2003B125
Reply to Office Action dated June 13, 2005
Amendment dated August 15, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (currently amended): A catalyst composition comprising consisting essentially of:

- (a) a rhodium component present in an amount such that the catalyst composition comprises less than 3.0% of rhodium by weight of the total catalyst composition; and
- (b) an indium component present in an amount such that the catalyst composition comprises at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 2 (Original): The catalyst composition of claim 1 and comprising at least 0.25% and less than 2.5% of rhodium by weight of the total catalyst composition.

Claim 3 (Original): The catalyst composition of claim 1 and comprising at least 0.3% and less than 1.5% of rhodium by weight of the total catalyst composition.

Claim 4 (Original): The catalyst composition of claim 1 and comprising at least 0.4% and less than 4.0% of indium by weight of the total catalyst composition.

Claim 5 (Original): The catalyst composition of claim 1 and comprising at least 0.5% and less than 3% of indium by weight of the total catalyst composition.

Claim 6 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.2 to about 1.1.

Claim 7 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.35 to about 0.75.

Claim 8 (Original): The catalyst composition of claim 1 and also comprising a support.

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Claim 9 (previously presented): The catalyst composition of claim 1 wherein the support is selected from alumina, zirconia and ceria-alumina.

Claim 10 (previously presented): The catalyst composition of claim 1 wherein the catalyst composition has been treated in a reducing atmosphere at a temperature of at least 300°C.

Claim 11 (Currently Amended): A method for making a catalyst composition, the method comprising:

(a) applying a rhodium compound nitrate to a an alumina, zirconia, or ceria-alumina support; and

(b) applying an indium compound formate or nitrate to the support;
to produce a catalyst composition which comprises ~~less than~~ 0.3 - 3.0% of rhodium and ~~at least~~ 0.3% and less than 5.0% of indium by weight of the total catalyst composition including the support.

Claim 12 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support concurrently.

Claim 13 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support consecutively.

Claim 14 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by impregnating the support with a solution of the compound.

Claim 15 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by precipitating the compound from a solution containing ions of at least one of rhodium and indium.

Claim 16 (Original): The method of claim 11 wherein the rhodium compound is rhodium nitrate.

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Claim 17 (Original): The method of claim 11 wherein the indium compound is indium nitrate or indium formate.

Claim 18 (previously presented): The method of claim 11 wherein support is selected from alumina, zirconia and ceria-alumina.

Claim 19 (Original): The method of claim 11 and further including, after at least one of (a) and (b), calcining the support at a temperature of about 100°C to about 600°C.

Claim 20 (Original): The method of claim 11 and further including, after (a) and (b), treating the support in a reducing atmosphere at a temperature of about 100°C to about 600°C.

Claim 21 (Original): The method of claim 20 wherein said treating the support is conducted at a temperature of about 300°C to about 500°C.

Claim 22 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition made by the method of claim 11.

Claim 23 (Withdrawn): A process for selectively removing C₂ to C₄ alkynes or diolefins from a feedstock also containing C₂ to C₄ olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition comprising a rhodium component and an indium component, and the process producing an olefin-enriched product stream containing less than 20 weight % of oligomers of said olefins.

Claim 24 (Withdrawn): The process of claim 23 and producing an olefin-enriched product stream containing less than 10 weight % of oligomers of said olefins.

Claim 25 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock

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also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition comprising:

- (a) a rhodium component present in an amount such that the catalyst composition comprises less than 3.0% of rhodium by weight of the total catalyst composition; and
- (b) an indium component present in an amount such that the catalyst composition comprises at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 26 (Withdrawn): The process of claim 25 wherein the alkynes or diolefins have 2 to 4 carbon atoms and the feedstock also contains C₂ to C₄ olefins

Claim 27 (Withdrawn): The process of claim 25 wherein said contacting is conducted at a temperature of from about 20°C to about 150°C, a pressure of from about 690 kPa to about 4100 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1 to about 1000.

Claim 28 (Withdrawn): The process of claim 25 wherein said contacting is conducted at a temperature of from about 30°C to about 100°C, a pressure of from about 1400 kPa to about 3400 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1.1 to about 800.

Claim 29 (Withdrawn): The process of claim 25 wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 1 ppm.

Claim 30 (Withdrawn): The process of claim 25 wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 0.5 ppm.

Claim 31 (New): A supported catalyst composition comprising an alumina, zirconia, or ceria-alumina support; having less than 3.0 % rhodium by weight of the total supported catalyst composition, deposited from rhodium nitrate; and having 0.3-5.0% indium by weight of the total supported catalyst composition, deposited from indium nitrate or indium formate.